January 11, 1999

OFFICE OF THE HEARING EXAMINER
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REPORT AND DECISION ON
APPEALS OF THRESHOLD DETERMINATION

SUBJECT: Department of Development and Environmental Services
File Nos. **L95P0022** and **L97SH007**

NORRIS ESTATES
Preliminary Plat Application, Shoreline Application and
SEPA Threshold Determination Appeal

Location: Lying approximately between 248th Avenue Southeast and West Beaver Lake Drive Southeast, and between Southeast 24th Street and Southeast 17th Street

Applicant: Norris Family Trust
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SUMMARY OF DECISION:

Department's Preliminary Recommendation:	Deny the Appeal
Department's Final Recommendation:	Deny the Appeal
Examiner's Decision:	Grant in part and Deny in part

PRELIMINARY MATTERS:

Application or petition submitted:	December 5, 1998
Complete application:	
Subdivision	December 5, 1998
Shoreline Permit	July 30, 1997
Notice of appeal received by Examiner:	May 1, 1998
Statement of appeal received by Examiner:	May 1, 1998

EXAMINER PROCEEDINGS:

Pre-Hearing Conference:	May 22, 1998
Hearing Opened:	July 22, 1998
Hearing Closed:	July 22, 1998

Participants at the public hearing and the exhibits offered and entered are listed in the attached minutes. A verbatim recording of the hearing is available in the office of the King County Hearing Examiner.

ISSUES/TOPICS ADDRESSED:

- Aesthetics
- Flooding
- Historic sites
- Intervention
- Road capacity and mitigation
  - Arterial roads and intersections
- Road safety
- Surface water drainage
- Water quality

FINDINGS, CONCLUSIONS AND DECISION: Having reviewed the record in this matter, the Examiner now makes and entered the following:

FINDINGS:

A. INTRODUCTION AND PROCEDURAL ISSUES

1. On December 5, 1995, a complete application was filed by the Norris Family Trust to subdivide 56.98 acres into 226 lots for single family residential development. The property is a mostly wooded parcel which lies north of Beaver Lake Park, and west of Beaver Lake and its historic vacation cabin community, within a generally rural area that is in transition to Urban density residential development. Recent major residential developments within this portion of the Sammamish Plateau include the Trossachs and Beaver Lake Estates east of Beaver Lake, and Renaissance to the northwest of the Norris Estates property. Primary access is along the southern boundary of the site on southeast 24th Street, which connects west to 228th Avenue Southeast. Southeast 24th Street west of 244th Avenue Southeast has been recently redesignated to collector arterial status.

2. A mitigated determination of nonsignificance was issued by King County Department of Development and Environmental Services ("DDES") for the Norris Estates proposal on April 7, 1998. The MDNS contains a number of conditions designed to mitigate impacts in the areas of drainage, water quality and traffic. Two timely appeals to the MDNS were filed, one by the Beaver Lake Protective Association ("BLPA") alleging a wide range of potential impacts to Beaver Lake and the surrounding community created by the proposal. A second, more limited appeal was filed by Shawn and Jane Tillman on behalf of themselves and other family members who own properties adjacent to the southeast corner of the proposed plat. The Tillman appeal focuses on alleged adverse impacts to these specific properties.

3. A prehearing conference was held on the above-referenced appeals and the underlying plat application on May 27, 1998, and a prehearing order issued June 5, 1998. The prehearing order defined the issues within the SEPA appeal in terms of water quality and drainage impacts to Beaver Lake, Laughing Jacobs Creek and Laughing Jacobs Lake; loss of wildlife habitat; traffic impacts to the arterial system serving the Sammamish Plateau generally as well as neighborhood circulation and safety issues within the Beaver Lake area; local community impacts in the areas of aesthetics, glare, noise and historic preservation; and the recreational impacts of the proposal on Beaver Lake Park and its swimming beach. In addition, the prehearing order authorized a discovery process for the benefit of the parties and requested the Applicant to provide traffic level of service ("LOS") information at certain identified area intersections.

4. The prehearing process additionally required the consideration and resolution of a number of procedural issues. First, a petition from Save Lake Sammamish to intervene in the process was denied on the basis that the organization's primary concerns were unrelated to the SEPA appeal issues and its interest in potential plat impacts to the water quality of Lake Sammamish could be adequately addressed through normal public hearing testimony.

5. Second, as a consequence of dissatisfaction over the adequacy of discovery responses, the Applicant moved to dismiss the Beaver Lake Protection Association's SEPA appeal. While this motion was in most respects denied, it did result in the elimination of some peripheral issues from the SEPA appeal. The issues eliminated were those relating to wildlife habitat loss and impacts to recreational swimming through pollution of the lake waters.
6. As originally propounded by the Appellant the Beaver Lake Protection Association, the appeal also included an attack on the traffic concurrency certificate issued for this project by the County Department of Transportation. At the Department's request the parties agreed to defer consideration of this issue until completion of the review of similar issues within an appeal for the preliminary plat of the Greens at Beaver Crest (L97P0011), located northwest of Norris Estates along Southeast 8th Street. A further complication arose at the end of July when the Appellant's traffic engineer withdrew from the case based on a conflict of interest. The Appellant was given until the end of August to secure a replacement traffic engineer conversant with the computer modeling process that underlies the traffic concurrency determination.

7. On August 31, 1998, the BLPA submitted to the record the name of a traffic engineering firm in San Jose, California with whom it had contracted to receive an analysis of concurrency issues and potential witness testimony. Final argument on all non-traffic issues was received on September 4, 1998, at which time the Examiner set a deadline of September 18, 1998, for completion of initial review and identification of alleged concurrency errors by the Appellants' traffic consultant.

8. On September 11, 1998, the Beaver Lake Protection Association notified the Examiner that it would not be able to meet the September 18, 1998, deadline for preliminary analysis and issue identification. The indication was that the earliest that the consultant could comply with the order would be September 30, 1998. On September 21, 1998, the Examiner dismissed the traffic concurrency issue from the SEPA appeal and set an October 9, 1998, briefing deadline for non-concurrency traffic issues. While cognizant of the fact that there were potentially legitimate traffic concurrency issues raised by the BLPA appeal, the Examiner concluded that the element of extended delay placed an unreasonable hardship on the Applicant and needed to be regarded as the determining factor in bringing the concurrency portion of the appeal to a close.

B. TRAFFIC AND ROADS

9. As stated within the prehearing order, the traffic issues subject to SEPA appeal review included level of service and capacity impacts within the arterial system serving the property and connecting south to Interstate 90 and north to SR 202 and SR 520. The traffic impact analysis performed for the proposal dated August 29, 1995, was based on a projected 300-dwelling units and a trip distribution pattern determined by PM-peak hour traffic counts taken in 1995. Nineteen ninety-five (1995) traffic count volumes were factored upward by a historical growth rate for the Plateau to derive projections for a 2001 horizon year.

Using the traffic count patterns, the Applicant's engineer assigned 35% of project traffic to the Southeast 24th Street corridor, with 30% going north on 228th Avenue Southeast and the remaining 5% oriented south via 228th Avenue Southeast to Southeast 43rd Way.

10. The bulk of southern-oriented traffic was assigned in the study to 244th Avenue Southeast. At its intersection with Southeast 32nd Street, 15% of site traffic travels east toward Duffy Hill Road, while 45% heads south toward the I-90 corridor via Southeast 32nd Street, Issaquah/Pine Lake Road and Issaquah/Fall City Road.

11. Because the traffic impact analysis did not include any intersections north of Southeast 24th Street or south of Southeast 32nd Street, the prehearing order requested the Applicant to provide additional information concerning other intersections which serve the major Plateau arterial corridors. This resulted in a detailed supplemental traffic study dated July 9, 1998, assembled by project traffic engineer Gary Norris. The trip distribution for this later study was based on the County's traffic concurrency model rather than area traffic counts. It resulted in a major shift in southbound traffic distribution away from the 244th Avenue Southeast/Southeast 32nd Way/Issaquah-Pine Lake corridor in favor of the westerly route along Southeast 24th Street to 228th Avenue Southeast, then south to Southeast to 43rd Way. As a consequence of this traffic distribution shift, Mr. Norris' revised figures show the portion of project traffic passing through the Southeast 32nd Way/Issaquah-Pine Lake Road intersection dropping from 45% to 29%, while the quantity of traffic passing through the intersection at 228th Avenue Southeast/Issaquah-Pine Lake en route to 43rd Way Southeast rises from 5% to 36%.

12. This trip distribution shift is explicable in terms of the congestion patterns which affect access to the I-90 corridor where it passes through Issaquah. The worst congestion appears to occur where Issaquah-Fall City Road and East Lake Sammamish Parkway intersect, just north of the Front Street ramps to Interstate 90. A number of traffic studies have described the Issaquah-Fall City Road/East Lake Sammamish Parkway intersection as currently operating at LOS F during the PM-peak hour. Among the most recent studies is one performed by the Transpo Group in June 1998 for the Issaquah Retail Center, which shows this intersection operating at LOS F both overall and for the through, northbound right turn and southbound left turn movements, with a volume to capacity ratio of 1.13. Although a CIP project for this intersection will add a second dedicated right turn lane, traffic growth will maintain the overall level of service F even after the CIP, with the v/c ratio increasing to 1.33.

13. Mr. Norris' additional traffic data summarized in Exhibit 106 shows the Issaquah-Fall City Road/East Lake Sammamish Parkway intersection operating at a relatively benign LOS D during the AM -peak hour. However, this level of service figure appears to be meaningless because the traffic flows upon which it is based are artificially constricted by congestion further south backing up from the I-90 interchange. Both Mr. Norris and Paulette Norman from the County Department of Transportation agreed that the following quotation taken from the Dansbury Estates Phase II TIA was an accurate description of conditions currently obtaining at the Issaquah-Fall City Road/East Lake Sammamish Parkway intersection:

> "Existing LOS is meaningless since the ramp meter on the I-90 westbound ramp at the Front Street interchange is creating vehicle queues, which extend to the Issaquah-Fall City Road intersection, thus impeding traffic flow."

14. While it may be rational to conclude that traffic from Norris Estates will avoid the Issaquah-Fall City Road/East Lake Sammamish Parkway intersection by choosing a longer but less congested route via Southeast 43rd Way to East Lake Sammamish Parkway, then west on Northwest Sammamish Road to the SR 900 interchange with I-90, there remain loose ends that are not fully accounted for. For example, the 29% of project traffic assigned to the Issaquah-Pine Lake Road/Southeast 32nd Way intersection falls to 19% by the time it reaches Issaquah-Fall City Road/East lake Sammamish Parkway. Due to the lack of obvious intervening attractions to divert peak hour commuter traffic, one may question whether a loss of 1/3 of project traffic between these two points is a warranted assumption. Second, the alternate route itself has its own fair share of problems, and projection of an acceptable level of service at East Lake Sammamish Parkway/Southeast 56th Street is predicated on the implementation of improvements by other currently unconstructed development proposals.

15. The traffic issues that were the major focus of Appellant and neighborhood testimony at the public hearing concerned facilities more intimately connected to the Beaver Lake neighborhood. Many residents questioned the adequacy of Southeast 24th Street and West Beaver Lake Drive Southeast to accommodate the further traffic volumes associated with increased urban development. Southeast 24th Street, which fronts the southern boundary of the plat and provides primary access west to the 228th Avenue corridor and east to West Beaver Lake Drive, is currently constructed with 22 feet of pavement width with neither shoulders nor sidewalks for pedestrian use. Even so, owing to the nature of the Beaver Lake community, these roadways receive substantial recreational use, being used by local residents for walking, bicycling, and horseback riding. In addition, Beaver Lake is the site of a yearly summer triathlon and a half-marathon, both of which incorporate the roadways circling the lake.

16. It is clear that development of Norris Estates will significantly increase the level of traffic on Southeast 24th Street west of the plat entrance. Under the revised trip distribution assumptions, PM-peak hour volumes on Southeast 24th Street will nearly double from a 1995 total of 336 to 535 at Norris Estates buildout. While this figure is well within the theoretical capacity of the roadway, as pointed out by the Appellant's engineer, Michael Stringam, theoretical capacity figures can be misleading when the driving surface of the roadway also supports a significant level of recreational use. One can reasonably conclude that the increased traffic levels will make such uses less pleasant and more dangerous.

17 A second major area of Appellant and community traffic concern is more difficult to evaluate because it involves variables the natures of which are only partially disclosed by the hearing record. Perhaps the most curious of these phenomena is associated with the decision by the Applicant in September 1977 to redesign the preliminary plat map to eliminate a 90 degree entry turn into the plat from Southeast 24th Street and replace it with a curved approach.

Although this alteration was justified in terms of the access road's neighborhood collector function, what makes this revision unusual is that it includes an offer by the Applicant to dedicate a further 500 feet of 60-foot wide right of way for the future extension of a re-aligned Southeast 24th Street east to West Beaver Lake Drive. This roughly 30,000 square foot dedication is the equivalent to four or five platted lots.

While there are certainly major public benefits to be derived from this redesign, particularly in its potential for removing traffic flows away from the Beaver Lake Park entrance and enabling through-traffic to altogether avoid the 90 degree intersection at Southeast 24th Street and West Beaver Lake Drive, such a substantial dedication is remarkable in that it is unnecessary in terms of mitigating the identified traffic impacts from Norris Estates. No significant traffic volumes from the project have been assigned to West Beaver Lake Drive by the project's traffic study, and it has been the consistent position of the project traffic consultants, as stated within a July 3, 1996, memorandum from Gary Norris, that "aside from occasional intra-neighborhood interaction, traffic volumes generated within Norris Estates will not use Beaver Lake Drive on a regular basis" and therefore "the traffic-related project impact on Beaver Lake Drive is negligible."

18. Norris Estates will not construct a road within the dedicated 60-foot right of way beyond the plat entrance at Southeast 22nd Way. Moreover, completion of the connection east to West Beaver Lake Drive will require the public acquisition of perhaps two further lots before the road can be built. Nonetheless, the fact that the Subdivision Technical Committee encouraged the Applicant to make such a dedication has raised a red flag within the Beaver Lake community, which fears that such action signals a decision by the County to convert West Beaver Lake Drive and Southeast 24th Street into an arterial route linking east to Trossachs Boulevard and the newly developed Section 36 Park.

19. While no public commitment to this arterial route has yet been made, the wheels of government surely appear to be moving in this direction. At a County-sponsored workshop held within the community on July 30, 1998, four alternative scenarios were laid out each describing potential arterial connections west to Trossachs Boulevard. Two of these options involve converting West Beaver Lake Drive into an arterial route, with the primary alternative being an arterial connection along the east side of Beaver Lake south to Southeast 32nd Way. The Department of Transportation's description of the West Beaver Lake loop arterial option recognizes that the historic recreational usage of the roadway would be impaired; it proposes non-motorized improvements along the entire arterial stretch to Southeast 24th Street that will "greatly improve safety over what is there today."

20. On balance, it appears that the Beaver Lake community is justifiably concerned that the West Beaver Lake arterial route has become the preferred alternative and that its public announcement is largely a matter of timing.

This scenario not only makes sense in terms of staff efforts to persuade Norris Estates to dedicate right-of-way unrelated to the plat's traffic impacts but also by the logic of the community presentations assembled by the Department of Transportation within Exhibits 103 and 109. Exhibit 103 highlights the potential arterial connections and shows not only the alternatives under discussion but also completion of a linkage north from Southeast 24th Street along 248th Avenue Southeast to Southeast 8th Street and the 244th Avenue Northeast corridor. This linkage--shown in all four alternatives--connects to statements within the Exhibit 109 narrative to the effect that the new Section 36 Park will only be accessed from the south, i.e., *via* Trossachs Boulevard. If such is the case, then it becomes clear that the determining factor influencing the choice of arterial routes will likely be ease of access to Section 36 Park from residential properties lying to its west. This need provides the rationale for the 248th Avenue Southeast upgrade shown in Exhibit 103 and virtually dictates that arterial development for West Beaver Lake Drive will be the preferred arterial choice as the shorter and less convoluted route for traffic to and from Section 36 Park.

21. In addition to the foregoing, the Southeast 24th Street/West Beaver Lake Drive route has been identified for further study within County project ES-83 regarding further development of non-motorized facilities such as pedestrian trails, bicycle access and safety improvements. Southeast 24th Street also has been identified within the County Non-motorized Transportation Plan as a future site for bicycle and equestrian trails. Finally, the Southeast 24th Street/Beaver Lake Drive loop is also shown within the County's current Bicycle Trails Map as a bicycle route.

C. LOCAL COMMUNITY IMPACTS

22. Both the Beaver Lake Protection Association and Tillman appeals allege that construction of Norris Estates will have adverse impacts on nearby properties possessing a rustic and historic character. Testimony by local residents indicates that the area south of Norris Estates in what is now the Beaver Lake County Park was originally a resort and later a church camp, with the original resort development dating back to the 1920s and 30s. Since the recent reconstruction of Beaver Lake Park, little remains in the way of original structures, although the newer buildings have retained the traditional rustic design.

23. Most of the remaining historic structures in the Beaver Lake community are located northwest of the intersection of Southeast 24th Street and West Beaver Lake Drive within a neighborhood that is bounded on its northern and western sides by the Norris property. Within this neighborhood there are perhaps ten separate properties ranging from about ½ acre to one acre in size that are constructed with older single family residences. Of these at least three, the Detlor camp and Gladmar Trust properties (represented by the Tillmans), appear to possess obvious historic importance, having been constructed in the 1920s through the early 1940s in a log cabin style. The significance of this neighborhood was recognized by the County Council in 1993 during the East Sammamish Community Plan update, at which time a policy was adopted encouraging the neighborhood to seek historic district designation under the County's Historic Preservation ordinance.

24. With the altered design of Southeast 24th Street along the southeast border of the Norris Estates plat and the proposal to publicly dedicate sufficient right of way to complete the roadway to the property's eastern boundary, the potential impacts to the historic West Beaver Lake neighborhood will undergo a shift. Removal of the proposed neighborhood collector/arterial route away from the existing intersection at Southeast 24th Street/West Beaver Lake Drive has the potential to reduce future traffic impacts for about ten residences that currently front on the neighborhood collector route. On the other hand, the consequences of development of Norris Estates as currently proposed will greatly increase the adverse impacts experienced by the easternmost properties within the traditional Beaver Lake neighborhood.

25. Clearly, the most serious adverse impacts from the Norris development will be experienced by the Harrington and Gladmar Trust properties represented by the Tillmans and by the Church property adjacent to the south. Housing on these parcels is currently set back from the neighborhood collector road and accessed by gravel driveways within a quiet setting dominated by a canopy of fir and cedar trees. Most of these trees, however, are on the Norris site and are slated for removal. The forested canopy adjacent to the Tillman, Harrington and Church properties will be replaced by a series of large detention and water quality treatment ponds and, farther to the west, by the new neighborhood collector/arterial route. Most seriously impacted will be the historic cabin on Tax Lot 45, which instead of being a wooded retreat at the end of the gravel road will be surrounded on two sides by embankments enclosing detention and water treatment facilities. As shown by the photographs submitted by the Appellants taken at the nearby Trossachs and Beaver Lake Estates developments, detention ponds are typically graded and bermed, devoid of significant vegetation, and surrounded by chain link fences.

26. By any measure, the construction of Norris Estates will change the character of the environment surrounding this westernmost flank of lots within the traditional Beaver Lake neighborhood. But, as pointed out by the Applicant and staff, some trees will remain in the vicinity of the Tillman, Harrington and Church properties after construction of the plat. First, these parcels themselves have a few large trees on them. Second, the gravel driveway that serves these properties is within a 30-foot easement granted by the Norris family. Because the driveway is about ten feet wide and meanders in and out of the easement, there are trees within the easement itself that will remain. Beyond that, however, no serious effort was made by either the Applicant or staff to analyze the impacts of Norris Estates development and the resultant construction of a nearby neighborhood collector/arterial route on these older rustic properties.

27. The staff has declined to analyze the environmental impacts of Norris Estates development on the Tillman and other western flank properties within the Beaver Lake community at least partially on the premise that, as explained by SEPA planner Rich Hudson, these impacts are deemed addressed by the development standards contained in KCC Title 21A. Because such standards do not require buffers between residential properties with similar underlying zoning, the staff's position is that the impacts described by the Tillmans and other residents within the traditional Beaver Lake community have no legal status and in a technical sense do not exist.

The conditions proposed by staff to be placed on preliminary subdivision approval do not address impacts to adjacent properties at the plat's southeast corner, except for Condition 23. This is a drainage condition that will require a geotechnical study addressing the design of stormwater facilities to make sure that any ponds constructed above the till layer will not seep stormwater onto downslope properties to the east.

D. SOUTHEAST 24th STREET FLOODING

28. All surface water drainage from the Norris Estates property is eventually discharged into the Laughing Jacobs Creek system. Flow from 15 acres will be conveyed directly south to the Creek through Beaver Lake Park, while the majority of the site drains first to Beaver Lake and then to the Laughing Jacobs system *via* an outlet creek. After exiting the south end of Beaver Lake, Laughing Jacobs Creek flows westward along a channel that intertwines the right of way for Southeast 24th Street until it reaches Wetland 26, where it turns south and flows to Laughing Jacobs Lake.

29. An issue raised by many Beaver Lake neighborhood residents concerns the frequent flooding of Southeast 24th Street, both at the Laughing Jacobs Creek culverts and at Wetland 26. As a consequence of these problems, the Applicant was requested by DDES to study the flooding issues in considerable detail, culminating in a hydraulic evaluation performed by Shapiro & Associates and Haozous Engineering dated March 1997. This study analyzed eight culverts within the Laughing Jacobs Creek system lying between Beaver Lake and Wetland 26.

30. The hydraulic study calculated the existing and projected flows to these culverts under a number of different treatment scenarios, the capacity of the culverts, and the stream's 100-year floodplain. Based on this analysis, the study concluded that three culverts are primarily responsible for the flooding between the Lake and Wetland 26, two being cross-culverts beneath Southeast 24th Street and the third a culvert beneath a power line maintenance road within Beaver Lake Park. Because Norris Estates comprises less than 5% of the watershed contributing flows to Laughing Jacobs Creek, the study was able to conclude that no measurable benefit would result from imposing a Level 3 rather than a Level 2 detention standard on the plat. The study also determined that because of the attenuating affects of Wetland 26, increasing the capacity of the three culverts currently restricting creek flows would have negligible downstream flooding impacts.

31. As currently proposed, a number of private and public actions will combine to alleviate the flooding along the Southeast 24th Street corridor. The County has already upgraded the culvert beneath Southeast 24th Street lying west of 242nd Avenue Southeast and has adopted a CIP to raise the level of the roadway through the Wetland 26 area. Under the SEPA conditions Norris Estates will be required to increase the culvert capacity beneath Southeast 24th Street between 242nd and 244th Avenues Southeast. These efforts in combination will relieve the current flooding conditions, leaving only the overflow condition within Beaver Lake Park north of the athletic fields to be remedied at some future time.

E. BEAVER LAKE WATER QUALITY

32. In the early 1990s a number of agencies, including King County, the State Department of Ecology, Metro, and local Beaver Lake neighborhood groups collaborated to fund a Beaver Lake Management Plan prepared by the Entranco environmental consulting firm. The plan was published in November 1993 and undertook a lake restoration study to determine the current biological, physical and chemical conditions of the lake, provide a restoration and management plan to prevent degradation of lake water quality, and to provide a framework for an ongoing monitoring and education process. The King County Council in 1994, under authority of Ordinance 11522, authorized formal adoption of the Beaver Lake Management Plan and implementational public rules subject to the requirement that a lake management district be formed. In 1995 property owners in the Beaver Lake neighborhood formed such a management district, and Public Rule PUT 8-7 was promulgated by the County Surface Water Management Division for administrative implementation of the lake management plan.

33. The Beaver Lake Management Plan was based on extensive lake monitoring performed during the 1992 water year. This analysis determined that while the smaller Beaver Lake No. 1 had already passed over into eutrophic status, the larger Beaver Lake No. 2 remained mesotrophic, just below the point of transition to eutrophic status. The plan determined that the factor governing the lake's trophic status was its level of phosphorous loading. In other words, phosphorous was identified as the nutrient controlling the lake's level of nuisance algae growth. Since the lake's watershed at the time of the study was largely undeveloped, the Plan concluded that the then-existent phosphorous levels should be regarded as the natural condition. Based on the study's conclusions, the Plan established an overall policy of no further degradation of water quality within the lake and identified a series of management strategies and goals to achieve this policy.

34. In addition to describing the lake's physical status and hydrological cycle, the study also identified a few unusual characteristics. First, due to the fact that many of its watershed flow sources pass through wetlands and bogs, the water of Beaver Lake displays a brownish tea color that inhibits sunlight penetration. Second, during the warm season the lake experiences a high degree of thermal stratification that threatens salmonid fish life. That is, the top thermal layer rises to temperatures that are too warm for salmonid populations, while the cold lower layer contains too little oxygen. Therefore, summer salmonid fish use is limited to a very narrow band lying at the interface of the epilimneon and the hypolimneon. Finally, Beaver Lake is characterized by a relatively low rate of internal loading during summer anoxic periods from phosphorous released by lake sediments.

35. The passage from one trophic state to another is a matter of progression along a continuum. Accordingly, the classification of lake trophic status according to various measurement indices is usually expressed as a range, with the upper limit of any trophic measurement overlapping the lower limit of its classificatory neighbor. Within this system, the Beaver Lake Management Plan takes a fairly conservative approach, setting the boundary between the mesotrophic and eutrophic states at an average concentration of 20 micrograms per liter of phosphorous.

36. The management strategies outlined in the Beaver Lake Plan are primarily related to the annual phosphorous loading model graphically depicted within Figure 42. As noted, this figure shows the line between mesotophic and eutrophic states being set at a phosphorous concentration of 20 micrograms per liter, with an existing annual epilimnetic concentration of 19 micrograms per liter. The 1992 level of phosphorous concentration is correlated with an annual phosphorous loading to the lake of 142 kilograms. As modeled, the acceptable level of annual phosphorous increase consistent with maintenance of mesotrophic status is 146 kilograms per year, which correlates with a phosphorous concentration of 22 micrograms per liter.

    The Plan also recommends a number of management tools designed to accommodate new development within the watershed without exceeding the allowable phosphorous budget for maintaining the lake's current trophic status. These include elaborate monitoring recommendations, facility inspection and maintenance protocols, educational programs, plant and wildlife management, and various contingency measures, including alum treatment and aeration as last resort restorative strategies.

37. Among the 16 management recommendations listed in the Plan, the one that has received primary attention within this hearing has been recommendation BL-2, establishing an 80% total phosphorous reduction goal above background levels for stormwater treatment for all future development. Within the Plan's discussion of BL-2 the following key statement appears:

> "Future phosphorous loading to Beaver Lake is predicted to be 254 kg/yr without stormwater controls. Under current conditions, annual loading is 142 kg/yr. If 80% (or more) of the total phosphorous associated with stormwater runoff from new development can be removed prior to entering Beaver Lake, it is predicted that annual loading to the lake will increase to only 146 kg/yr. This level of phosphorous increase would not be expected to cause significant change in the lake's trophic status."

38. This descriptive statement projecting an acceptable annual loading of 4 kilograms of phosphorous per year is associated with development scenario No. 2 in Chapter 7 of the Plan. It projects the number of homes within the Beaver Lake watershed increasing from 215 in 1992 to a maximum of 1,725. While the Plan implies that 1,510 new homes can be added to the watershed under the 80% phosphorous removal treatment scenario without exceeding the 146 kilograms per year limit, no computations in support of this conclusion have been provided, and some observers are skeptical as to whether this goal can be attained. This skepticism appears warranted. Using the phosphorous loading values contained within the Plan, and assuming that for each of 1,510 new homes 3,000 square feet of forest area was converted to impervious surface, even with treatment for 80% additional phosphorous removal more than 13 kilograms per year of TP would be added to the lake.

    At this point in time, however, the watershed remains largely undeveloped, and the germane issue becomes whether lots proposed for Norris Estates, when combined with other major developments constructed within the watershed since 1992, are likely to exceed the 4 kilograms per year additional phosphorous loading tolerance specified by the Plan.

39. The Applicant proposes to meet or exceed the 80% phosphorous reduction goal stated within the Beaver Lake Management Plan by means of a treatment chain to process runoff within the 42-acre portion of the site draining to Beaver Lake. This treatment chain comprises an oversized wetpond followed by a large sand filter designed to treat 95% of the average annual flow volumes projected. Within this context, the issues that were debated in the hearing concern whether the Applicant's predicted treatment efficiencies are realistic and whether the cumulative impacts of phosphorous loading to the lake will fall within acceptable limits, as well as the larger question of whether recent monitoring data demonstrates that the lake has already moved into a eutrophic state.

40. The 1997 water year for Beaver Lake was also subject to an extensive monitoring program and resulted in an annual report examining potential changes in the lake's trophic status since 1992. Because it was generally agreed that water quality impacts to the lake from new residential development should not appear in the data on a regular basis until after the 1997 water year, the discussion focused on whether water quality within the lake was deteriorating even in the absence of major new development-generated impacts. Sharon Walton, the King County limnologist who prepared the 1997 annual report, identified increases in parameters that could suggest a worsening of Beaver Lake water quality if 1997 were regarded as an average year. In fact, Ms. Walton's position was that 1997 was a very high rainfall year. According to her view, observed 1997 fluctuations in key parameters are better explained in terms of the effects of high rainfall, unless similar results are also obtained during future normal rainfall years.

    The parameters of particular concern were, within Beaver Lake No. 2, a significant elevation of the chlorophyll *a* annual mean concentration from 3.9 milligrams per liter in 1992 to 10.4 in 1997, and an increase in the mean annual whole-lake total phosphorous concentration from 22.2 milligrams per liter in 1992 to 34 in 1997. These values are accompanied by a fairly steady increase since 1991 in Beaver Lake No. 2's Trophic Status Index from 43.4 to 48.5, with a rating of 50 denoting passage to a eutrophic state. In this respect, Ms. Walton's report concludes that "the TSI data does suggest that Beaver Lake 2 has shifted from the lower end of the mesotrophic range to the middle of the range over the past decade." In addition, a further issue of concern identified within the 1997 report was a period near the end of the summer characterized by the dominance of nuisance-producing blue-green algaes within the lake system.

41. On the question of whether the 1997 phosphorous increased readings are cause for serious concern, Tom Smayda, the Appellant's water quality consultant, took the position that these phenomena were indicative of a clear movement toward eutrophic status even after the exceptional rainfall data were factored in. But Ms. Walton and the Applicant's consultants responded that higher rainfall meant abnormally high short-term phosphorous loadings accompanied by dilution of water color, both of which could produce a temporary spike in key trophic measurements.
42. While it is impossible to resolve this dispute on the basis of the 1997 data alone, the higher rainfall explanation put forward by Ms. Walton appears to be an adequate and credible hypothesis. Accordingly, the Appellant has not established by a preponderance of the evidence that the 1997 monitoring data establishes an unambiguous movement of the lake towards greater eutrophic status.

Ms. Walton's explanation is buttressed by the fact that after the very high spike in phosphorous concentration was experienced in November 1996, the whole lake total phosphorous curve largely reverted to its historic pattern. It is also significant that the inflow loading data from the two Beaver Lake feeder creeks in 1998 also receded to historical levels of phosphorous concentration. Thus, while there appears to be a potential gradual trend toward greater eutrophic characteristics, the major changes in trophic readings experienced during the 1997 water year are, for the most part, anomalies produced by exceptional rainfall. This is not to say that these elevated readings should be ignored, but rather that major conclusions are premature. As noted by Ms. Walton's report, future monitoring will need to consider whether a trend of higher algae biomass levels is occurring and whether increased phosphorous loading may trigger changes in the lake's sediment release rate.

43. In like manner, the issues surrounding the effectiveness of the proposed Norris Estates' treatment system to reduce total phosphorous cannot be resolved conclusively based on existing data. While there seems to be a consensus that large wetponds are capable over the long term of removing 50% of total phosphorous, sand filters are a much more experimental technology and exhibit a wider range of measured removal efficiencies. The analysis is further complicated by the fact that not only is the data base sparse, there are many variations in sand filter system design, making it difficult to assess the relevance of historical data to the performance of newer treatment approaches. In particular, while most sand filter systems have some form of pre-settlement chamber, there is little data dealing with the performance of a treatment chain consisting of a large wetpond followed by a large sand filter.

44. The range of disagreement between the Applicant and the Beaver Lake Protection Association over the Norris treatment system's potential phosphorous removal capability is substantial. Based on national data, the Appellant's consultant, Richard Klein, argued that a long term phosphorous removal rate in excess of 50% is difficult to justify. The Applicant, on the other hand, largely on the basis of recent studies performed at the Lakemont facility in Bellevue, contended that an 80% removal rate is attainable. While the permutations are numerous, the fundamental framework of the argument is rather straightforward. The Appellant's position is that while short term phosphorous removal efficiencies in the 80% range occasionally may be achieved, such a high removal rate is not sustainable over the long term due to degradation of the filter medium. As phosphorous is removed by a sand filter, it will form a crust on the surface of the medium and clog the interstices between the sand grains, both phenomena resulting in a loss of filtration efficiency. In addition, as sand filters clog or wetponds build up a phosphorous-ladened sediment, they are liable to re-release phosphorous into low concentration flows such that inflow phosphorous concentrations sometimes may be below those measured at the outflow.

The Appellant also argued that the phosphorous removal functions of wetponds and sand filters are duplicative, to the end that the efficiencies of a treatment train are less than the sum of the two facilities individually. The argument is that ponds and filters both are effective at removing particulate phosphorous, but in the absence of ionizing amendments, neither will remove significant quantities of dissolved phosphorous. This has led Mr. Klein to maintain, based on the work of Thomas Schueler, that ponds and filters can only remove phosphorous above a specified irreducible minimum, and long term efficiencies in excess of that minimum cannot be attained.

45. Reliable data describing the phosphorous removal efficiency of sand filters is almost nonexistent within the national data. The City of Austin, Texas has been a pioneer in sand filter experimentation and has attempted to assess the performance of its facilities. Beyond obvious deficiencies in the design and execution of its monitoring procedures, the Austin data tends to be focused on small commercial facilities with high percentages of flow bypass, and inflows characterized by high phosphorous concentrations. Within this context, the most recent Austin report from 1997 describes the Barton Ridge Plaza sedimentation and filtration facilities as treating three acres of first-flush commercial flow over a two-year period at a 59% overall removal efficiency for phosphorous. Similarly, a manual published for the Center for Watershed Protection in December 1996 entitled "Design of Stormwater Filtering Systems" contains some very generalized summary data from nine studies showing sand filters removing between 55 and 65% of total phosphorous. The manual is skeptical of the ability of sand filters to remove the more biologically accessible forms of phosphorous such as ortho or soluble reactive phosphorous and subscribes to Schueler's hypothesis that long term removal of phosphorous below an irreducible concentration of approximately 140 micrograms per liter is difficult to achieve. Based on an assumption of dissolved fractions in the 40-50% range, some level of irreducible concentration may be a useful concept, but it is not at all clear that Schueler's figure is an appropriate one in view of its low coefficient of reliability.

46. While subject to limitations, the 1997 Lakemont facility monitoring program annual report appears to be the most rigorously designed and best managed of the various available studies that purport to measure sand filter phosphorous removal efficiency. Lakemont is a 252-acre single family and multi-family housing development within the Lewis Creek drainage in Bellevue. It combines stormwater detention and water quality treatment functions within a facility that includes a splitter box, a wet vault, two sand filters and a dry pond. Treatment flows are switched between the two sand filters on a 72-hour rotating basis. Both sand filters contain chemical amendments, the north filter having been amended with a 10% volume of calcitic lime during its two operational years, while the south filter initially contained calcitic lime but was later amended with processed steel fiber in November 1996.

47. The phosphorous removal efficiencies generated by the Lakemont treatment system for the two monitoring years reported are potentially promising. For the six months monitored in 1996, which included the high flow winter months, the mean removal efficiency of the wet vault and sand filter system was calculated to be 79%. 1996 was the year that both filters had been amended with calcitic lime. For l997 the monitoring period did not contain the heavy winter rainfall months, and one of the filters was amended with iron fiber while the second, lime-amended filter was off-line for most of the monitoring period. For 1997 the calculated phosphorous removal efficiency of the system was 67%.

48. While this data is auspicious, any long term conclusions based on the Lakemont experience seem premature. First, as noted, there is test data only for parts of two years, and in the second year system down-time was extremely high. It is not possible to make reliable long-term performance projections on this limited data base. In addition, the two test years encountered higher than

normal rainfall, which both resulted in diluted inflow concentrations and contributed to the fact that 40-60% of total flows during the monitoring period bypassed the treatment facilities.

49. Although the Lakemont monitoring program was well designed and based on random sampling rather than matching outflows with inflows, the validity of such data is dependent upon a sufficient number of sampling events. Within the study's sampling plan, in order to overcome the influence of variability a protocol of at least 28 yearly samples for each primary parameter was established. Due to extensive system downtime, in 1997 less than 50% of that sampling goal was met. As a consequence of the limited and somewhat erratic database for 1997, there are certain anomalies that remain unexplained, such as an unexpected decline in the removal efficiency of the wet vault and phosphorous inflow concentrations which are unusually low.

50. There are also obvious design differences between the Lakemont and Norris systems that make direct comparisons between the two tenuous. In addition to a higher percentage of flows that bypass the treatment system altogether, the Lakemont filters consist of amended sand mediums, calcitic lime for both in 1996 with one filter amended with iron fiber in November 1996. Both amendments are designed to increase ionization activity within the filter medium in order to remove a higher percentage of the dissolved phosphorous fraction, which may comprise as much as 50% of the total. Since Norris is proposing an unamended system, its removal efficiency cannot reasonably be expected to equal or surpass that achieved by the amended Lakemont filters.

51. Another important difference between the two systems is the fact that Lakemont employs alternating sand filters rotated into service on a 72-hour cycle. Alternation of sand filters eliminates long term medium saturation, thus reducing anaerobic conditions and minimizing the possibility of phosphorous re-release into the stream flow.

52. A last definitive element of the Lakemont experience that merits discussion arises from the fact that, as an experimental facility subject to an elaborate monitoring program, the Lakemont system has received a degree of tender loving care that is unlikely to be duplicated elsewhere. Some sense of this ongoing process of analysis and adjustment is conveyed by the following narrative which appears in the 1997 report at page 6:

> Collection of flow data for the 1997 monitoring period began on February 3, 1997, and continued through September 30, 1997. Water quality sampling of the facility for the 1997 monitoring period began February 26, 1997, and continued through August 21, 1997, with interruptions due to instrument failure and facility maintenance (Table 2). The filter beds were taken offline from May 1, 1997, through June 4, 1997, to repair flow instruments at Station 3 and rototill the filter beds to improve hydraulic conductivity. During this period, all flow entering the facility was routed to the dry pond. Water quality sampling was suspended at Stations 2, 3, and 4 on May 1 and at Station 1 on May 2, 1997. Water quality monitoring was resumed at all stations on June 9, 1997. From August 2 to August 21, 1997, Station 3 was offline due to a failed mechanical relay on the controller. Water quality sampling at Station 3 did not occur during a large portion of the study due to equipment malfunctions.

On August 21, 1997, the 1997 water quality sampling period ended, and on August 22, 1997, the drain to the wet vault was opened to drain the vault for inspection. On September 9, 1997, the vault was inspected and the facility was brought back online. On September 19 the filter bypass valve failed at the wet vault, and the drain to the wet vault was opened. The facility remained offline through October 30, 1997."

53. More critical to our immediate concerns is the high percentage of maintenance activity at Lakemont that was dedicated to maintaining the hydraulic conductivity of the sand medium. As previously mentioned, a major criticism made by area resident Greg Allen and others has been that, while sand filters may perform exceptionally well initially, they quickly clog with sediments, at which point their removal efficiency drops rapidly. The following paragraphs are taken from Section B.3 of the Lakemont report:

"Hydraulic conductivity monitoring conducted in 1997 also indicated that the hydraulic capacity of the filters declined in mid-to late-February following the heavy winter storm loading. Although the 1997 sampling period did not begin until late February 1997, the filters were first brought online for the season in November 1996 following extensive media modifications, which occurred in October. The October modifications included the removal of approximately 1 foot of sand media from the north filter and the removal of about 9 inches of sand, followed by replacement with a mixture of sand and processed steel fiber (PSF), in the south filter. Sand was removed from the north filter to reduce the total media depth to match the level present in the south filter. Removal operations not only reduced the overall media depth, but also removed the fine-grained sediment that had deposited on the surface of the filter from earlier storm events. This thin layer of fine-grained sediment, which tends to build up on the surface of the filter, inhibits flow through the filter and dramatically reduces the filter's hydraulic capacity. Approximately 46,000 lbs of PSF were added to the south filter to enhance the removal of dissolved phosphorus, resulting in a total sand- to-PF ratio of about 95 to 5% (by volume).

"Hydraulic conductivity monitoring consisted of measuring the drop in water level over time in each of the filters at the end of the 3-day on cycle. These measurements were then used to estimate the hydraulic conductivity of the filter media. Water-level measurements did not begin until March, when the hydraulic capacity of the filters had already noticeably declined. In November and December, the filters were observed to drain rapidly following the 3-day on cycle, usually draining entirely dry within one day. However, this changed dramatically sometime in February, when it was observed that the filters were no longer draining during the three-day off cycle. Measurements collected in early March indicated that the hydraulic capacity of the filter media had declined to less than 0.5 inch per hour. Because of this decline in filter hydraulic capacity, the filters were taken off-line to drain in May and then rototilled on June 4 to break up the thin layer of fine-grained sediment that had built up on the surface. At the time the filters were rototilled in June, this clogging layer was no more than 0.25 inches thick. Rototilling was effective in re-establishing the filters' hydraulic capacity, after which the filters were again capable of draining within about 1 day.

> A one-day drain time corresponds to a hydraulic conductivity of approximately 1.5 in/hr (assuming filter drains from completely full, i.e., 6 feet of water to completely empty in 24 hours).
>
> "Hydraulic conductivity monitoring was not performed in 1996. However, measurements taken during the current 1998 monitoring period has shown similar declines in filtration capacity as the filter surface becomes clogged with fine-grained sediment. On January 14, 1998, the south filter contained approximately 4.75 feet of water. By the next day, the filter had drained. This corresponds to an hydraulic conductivity of more than 1.3 in/hr. Similar measurements were collected in March 1998. In March, the hydraulic conductivity had declined to less than 0.4 in/hr (0.98 foot drop in water level over a 23-hour period)."

54. Finally, within the Conclusion section of the report on page 24, the programmatic implications of this maintenance are identified:

> "To counter the effects of surface clogging, the maintenance program for the Lakemont filters has been modified to include a mid-winter scraping of the filter surface to remove accumulated sediment. Starting in 1998, both filters will be scraped in the early spring to restore hydraulic capacity. Then, depending on spring rainfall conditions, as well as the observed filtration rate in the filters, a second scraping or rototilling may be conducted in the summer to prepare the filters for the next wet season."

55. The Lakemont report supports the proposition that high sand filter removal efficiencies are tied to frequent maintenance activities designed to counteract clogging of the filter medium. Thus, the question arises as to whether simply turning the Norris sand filters over to the County for maintenance will reasonably assure the long term, high efficiency performance of the facility necessary to meet an 80% treatment goal. In this regard, the historical record is not encouraging. An October 1995 report issued by King County Surface Water Management Division attempted the relatively simpler task of evaluating the performance of water quality ponds and swales on the East Lake Sammamish Plateau in the general vicinity of the Norris development. What started out as an endeavor to monitor the efficiency of wetponds became instead an inventory of facilities that were neither constructed according to an appropriate approved design nor functioning properly. A major conclusion of the study was the following:

> "This study of water quality ponds and swales revealed that many newly constructed systems were not constructed or operating properly. Typical wetpond problems include empty ponds due to excess infiltration or outlet structure leakage, and improperly designed or installed flow splitters. Typical swale problems included sparse vegetation, ponding, or channelization. Data collection for facility evaluations will have little value unless the facility selected for monitoring is properly designed and constructed. In this study, design and construction problems compromised data collection efforts.

This conclusion was re-affirmed in even stronger terms within the Executive Summary prepared

for the 1995 report:

> "The project concluded that the implementation of wetponds and swales in the Issaquah/East Lake Sammamish is, at best, marginal. The failure of these facilities appears to be due to a combination of design, construction, and inspection shortcomings, and inadequate maintenance standards. Most of these problems may be attributed to the newness of stormwater treatment facilities and the general lack of understanding regarding the level of effort needed to make them work."

56. While it may be assumed that the County's stormwater inspection procedures have improved since issuance of the 1995 report, there is nothing in the record that supports a conclusion that the County is prepared to perform the levels of inspection and maintenance described within the Lakemont report. The County's current expectation is to be able to do an annual inspection of a sand filter facility, but it is not clear to what degree specific inspection protocols have been completed. More critically, the inspection process is supported by a declining revenue base, which calls into question the ability of the County to respond effectively to discovery of a system malfunction. Moreover, if a major failure of a dedicated stormwater system were to occur, funds to remedy such failure would likely be obtainable only under a capital improvement program, the funding of which would require County Council approval.

    For Norris Estates the SEPA conditions were written to require the developer to bond a follow-up facility inspection at 95% of plat buildout. This requirement may assure that there will be at least one point in time when the system is functioning as designed. But after the system is dedicated to the County, its maintenance and monitoring become a public responsibility. As suggested by Mr. Allen, it is not clear that the County's management and financial commitment to system maintenance at the back end of the process has kept pace with its front-end dedication to innovative design.

57. One experimental approach to the problem of high sand filter maintenance demands is being pursued by Dr. Andy Kindig, a consultant to the Applicant. At the nearby Trossachs treatment facility Dr. Kindig has recently planted grass on the surface of a sand filter. He has also conducted preliminary tests which suggest that the hydraulic conductivity of grass-surfaced sand filter beds declines at a lower rate than do filter beds without the grass topping. At this point, however, no tests have been performed to determine the filter bed's phosphorous removal efficiency with the top grass layer, and therefore no reliable conclusions as to its viability long term can be drawn. Nonetheless, it remains a potentially promising experiment, although Table 5.6 within the Center for Watershed Protection design manual suggests that grass covered filter beds may generate new maintenance requirements of their own.

58. This brings us to the question of attempting to estimate the increase in annual phosphorous loading to Beaver Lake that will result cumulatively from the development of Norris Estates in combination with recent construction at Beaver Dam and the Trossachs in the eastern portion of the watershed. Beaver Lake Estates has also been developed within the watershed but is designed, however imperfectly, to infiltrate all its stormwater runoff. Housing in Trossachs and Beaver Dam has mostly been completed since the beginning of 1997, and it is generally agreed that residential runoff impacts are not reflected in any Beaver Lake monitoring data prior to

1998.

59. The consideration of cumulative impacts has also generated a discussion as to the appropriate phosphorous loading coefficient that is to be applied to residential runoff. While national figures are higher and some local numbers appear to be lower, it has been assumed that the 236 micrograms per liter used in the Beaver Lake Management Plan is a reasonable level and ought to be used in calculating annual loading volumes.

59. A number of consultants have tried their hand at estimating the phosphorous loading rates to be attributed to new development within the Beaver Lake watershed. Predictably, the consultants employed by the Applicant have based their calculations on optimistic treatment rates, while Mr. Klein, employed by the Appellant, has been more skeptical. The Applicant's engineer, Dr. Ed McCarthy, has calculated for Norris Estates an estimated phosphorous loading based on an outflow discharge concentration mean of 42 micrograms per liter, which is slightly better than the level reported at Lakemont for the 1996 and 1997 monitoring years. Based on this outflow concentration and an inflow concentration governed by the Management Plan, Dr. McCarthy projects for Norris Estates an annual phosphorous loading of 1.72 kilograms per year at an effective system removal efficiency of 82%. In comparison, using similar assumptions, Mr. Klein's most recent estimate based on a 50% removal rate was just over 8 kilograms per year additional loading attributable to Norris Estates.

60. The environmental impacts statements performed for both the Beaver Dam and the Trossachs developments contain estimates of phosphorous loading to Beaver Lake. However, both EIS's were written prior to issuance of the Beaver Lake Management Plan, making the data and methodological assumptions contained in each to some degree different. Beaver Dam proposed within the Lake's watershed construction of 44 single family homes plus a golf course. Assuming a fairly high residential phosphorous loading rate of 383 micrograms per liter, with an 80% phosphorous removal rate for stormwater facilities and an additional 12% removal in transit through onsite wetlands, the Beaver Dam Master Drainage Plan identified additional loading to Beaver Lake from the project at 4.7 kilograms of phosphorous per year. Roughly half of this amount was attributed to fertilizer runoff from the golf course. The Trossachs EIS, on the other hand, assumed a relatively low residential loading rate of 200 micrograms per liter total phosphorous and a 70% removal rate, resulting in (for 55 lots) a 4.1 kilogram per year loading rate to the lake. In actuality, 61 homes are planned to be built at the Trossachs. These EIS estimates cumulatively project an additional 8.8 kilograms per year of phosphorous to be added to Beaver Lake from Beaver Dam and the Trossachs.

60. Although everyone agreed that the Beaver Dam and Trossachs loading estimates needed to be redone based on assumptions consistent with the Beaver Lake Management Plan, only Dr. Kindig attempted a revised estimate. Allowing that it was "a back of the envelope" calculation, Dr. Kindig testified that, based on Dr. McCarthy's assumptions for Norris Estates loading, he estimated a ballpark figure of 2.5 kilograms per year additional phosphorous loading for Beaver Dam, The Trossachs and Norris Estates combined. This estimate was generated by converting the 1.72 kilogram figure produced by Dr. McCarthy into a per lot loading factor, then multiplying

this factor by the total number of lots contained in the three developments.

62. Although Dr. Kindig's efforts are useful, his simplified approach, at best, identified the lower end of the continuum. His calculation not only preserves the optimistic assumptions made by Dr. McCarthy, but indeed compounds them in a way that appears to guarantee that the outcome is too low. While he did not provide any backup computations, simple arithmetic suggests that he used the entire quantity of housing proposed for Norris Estates as his divisor for generating a per lot loading factor. If so, the per lot estimate would be too low, based on the fact that approximately one-third of Norris Estates drains directly to Laughing Jacobs Creek and, within Dr. McCarthy's calculations, 40 Norris roofs would be infiltrated.

63. Equally problematic is Dr. Kindig's assumption that no runoff from the golf course will enter the Beaver Dam treatment system and be discharged to Beaver Lake. While the Beaver Dam MDP may have overstated golf course-generated loading impacts, a reasonable adjustment would have been to lower the golf course loading figure, not eliminate it entirely. A further questionable assumption is Dr. Kindig's conclusion that the phosphorous loading rate from the large lots within Beaver Dam and Trossachs will be no greater than from the small lots within Norris Estates. In view of the likelihood that the major difference between an upper income large lot home and an upper end small lot home is likely to be the amount of lawn area, such an assumption appears to be unwarranted. National data indicates that the loading rate for high maintenance lawns usually exceeds 1,000 micrograms of phosphorous per liter.

64. While high phosphorous removal rates appear to be attainable, a wet pond and sand filter treatment train is unlikely to average 80% phosphorous removal over the long term in the absence of a chemical amendment program and aggressive maintenance to assure filter bed hydraulic conductivity. Based on the level of maintenance currently provided by the County, a long term average phosphorous removal rate somewhere between 60 and 70% can reasonably be predicted. Such a rate, if applied to Norris Estates, Trossachs and Beaver Dam over the long term, will result in an increase in annual phosphorous loading to Beaver Lake greater than 4 kilograms per year. This is in excess of the amount that the Beaver Lake Management Plan has modeled as acceptable consistent with maintenance of the Lake's mesotrophic status.

65. A few related issues peripheral to the discussion of water quality remain to be considered. These derive from the fact are that runoff from Norris Estates will reduce site infiltration, leading to a loss groundwater recharge and higher volumes of surface runoff. The Appellant has argued that these phenomena will increase lake temperatures, raise lake levels in winter and lower them in the summer. While such effects on some minor level appear to be probable, issues of timing seem to be determinative of the seriousness of the impacts.

The temperature of water retained in a wet pond will certainly be higher in summer than comparable volumes infiltrated into the ground and released to the lake through interflow. But onsite geologic studies have shown that there is no groundwater discharge from the Norris site during summer. Accordingly, any loss of groundwater flows that occur will happen during winter months when temperature impacts are not at issue. In like manner, summer lake levels will not likely be influenced by Norris Estates development because, if summer flows from the

site are now nonexistent, development impacts cannot reduce such flows further.

On the other hand, there could be short term increases in winter lake levels associated with greater runoff volumes after Norris Estates' development. But with onsite stormwater retention designed to moderate peak flows, there is no evidence that such increases would be measurable or significant.

CONCLUSIONS:

1. The basic standard to be applied to the review of a threshold determination appeal is that the SEPA record must demonstrate the actual consideration of relevant environmental impacts. With respect to those relevant impacts shown to be actually considered, the decision of the SEPA official is entitled to substantial weight on review and shall not be overturned unless clearly erroneous based on the record as a whole.

2. In 1995 the State Environmental Policy Act was amended as it applies to jurisdictions that plan under the Growth Management Act to allow "requirements for environmental analysis, protection, and mitigation measures" adopted under the GMA to be deemed "adequate analysis of and mitigation for specific adverse environmental impacts of the project action to which the requirements apply." This option provided under RCW 43.21C.240 authorizing local jurisdictions that plan under the GMA to shortcut the SEPA process is hedged by a number of qualifying restrictions, the most fundamental of which are that the local agency must actually consider the specific probable adverse environmental impacts of the proposal, determine that its adopted ordinances and plans adequately address such specific impacts, and base its project approval upon compliance with these mitigation measures.

3. King County has determined to take limited advantage of the option provided by RCW 43.21C.240. KCC 20.44.080.C authorizes an abbreviated SEPA review process within the Urban Growth Area with respect to the use of substantive SEPA authority to condition or deny new development proposals. KCC 20.44.080.C lists certain chapters of the zoning code as "regulations to systematically avoid or mitigate adverse impacts" and declares that such regulations "will normally constitute adequate mitigation of the impacts of new development". Employment of this option is limited by the proviso that "unusual circumstances related to a site or to a proposal, as well as environmental impacts nor mitigated by the foregoing regulations will be subject to site-specific or project-specific SEPA mitigation".

4. Unusual circumstances apply to the SEPA analysis of the impacts of Norris Estates development on water quality within Beaver Lake, as evidenced by the fact that the Beaver Lake Management Plan has adopted a strict standard of no degradation to the current trophic status of the lake and specifies a limited quantity of annual phosphorous loading that the lake can tolerate without degenerating to eutrophic status.

5. Evaluation of the significance of Norris Estates' adverse environmental impacts is governed by the size of the proposal and the sensitivity of its environmental setting.

For a project the size of Norris Estates located in a critical watershed such as Beaver Lake to receive a mitigated determination of nonsignificance, its ability to fully and unequivocally mitigate adverse impacts to key water quality parameters must be assured.

6. The record demonstrates that an 80% phosphorous removal treatment goal for Norris Estates' stormwater flows into Beaver Lake cannot be expected over the long term without a program of chemical amendments to the sand medium and frequent maintenance to preserve the medium's hydraulic conductivity. No such program of amendment and maintenance is proposed by the Applicant, and none is currently provided by King County.

7. Without adequate assurances that a long term phosphorous removal goal of 80% can be attained by Norris Estates and by other developments within the watershed, the annual phosphorous loading limits stated within the Beaver Lake Management Plan will be exceeded and preservation of its current mesotrophic status will be threatened. The probability that the treatment regime proposed by Norris Estates, in combination with other watershed impacts, will cause the lake to degenerate to eutrophic status is a significant adverse environmental impact attributable to the proposal.

8. There are various remedies that may be pursued in alleviation of these impacts through the EIS process. First, the phosphorous budget within the 1992 Beaver Lake Management Plan may be calibrated against more recent data and, if appropriate, the loading levels adjusted. Second, the cumulative phosphorous inputs from Norris Estates, The Trossachs and Beaver Dam may be reassessed based on uniform assumptions and the results verified to some degree against recent monitoring data. The possibility exists that such inputs, when entered into a revised lake model, will result in a more generous projection of lake tolerance to additional phosphorous loading. If updated adjustments to the lake's phosphorous model are insufficient to resolve the water quality impacts issue, further modeling can be done with respect to lake sediment phosphorous build-up and algal mass. In addition, sensitivity analyses may be done for any or all of these parameters.

9. With respect to the Norris Estates' treatment scenarios, further data may be gathered and analyzed on the potential efficiency of the proposed wet pond plus sand filter treatment train. Consistent with attainment of the goal of no degradation of lake trophic status, a long term treatment program may be developed involving chemical medium amendments, necessary facilities monitoring and maintenance, and response protocols to remedy large scale system failure. Agencies responsible for the long term implementation of such a program can be identified and funding requirements and sources described.

10. Regarding traffic impacts, although the level of congestion at the south end of the Sammamish Plateau suggests the possibility of cumulative, unmitigated adverse impacts at key arterial intersections, the Appellant Beaver Lake Protection Association has not met its burden of proof to demonstrate by a preponderance of the evidence the likelihood of such impacts, and the appeal must be denied with respect to overall traffic congestion issues.

11. As to flooding along Southeast 24th Street, the Applicant, in coordination with public agency action, has committed to mitigation of flooding conditions such that they should decrease below current levels. Accordingly, no significant adverse impact to flood condition on Southeast 24th Street will result from the construction of Norris Estates.

12. With respect to traffic impacts west of the project entrance, Norris Estates will add traffic volumes to Southeast 24th Street but at a level that is well within the road's traffic capacity. Nonetheless, these impacts will be great enough to negatively affect some of the current recreational uses of the driving surface. These impacts are adverse but less than significant.

13. There are also potential impacts associated with the proposed extension of Southeast 24th Street along the project's southeast boundary resulting from the offer by Norris Estates to dedicate unconstructed right of way to the plat's eastern property line. While this dedication will greatly enhance the likelihood that this route will be eventually selected as the preferred arterial alignment for access to the Section 36 Park, SEPA analysis may be deferred until the new arterial alignment is specifically proposed and its discrete impacts may be more accurately analyzed.

14. On the other hand, the impact of neighborhood collector and stormwater treatment facility development by Norris Estates on properties adjacent to the southeast corner of the plat will be immediate and nonspeculative. The testimony of the Tillmans and other residents within this rustic, historic neighborhood as to the impacts of such development in the areas of aesthetics, noise, glare, historic amenities, and loss of privacy is largely unrefuted. The staff position on this constellation of issues was to the effect that such impacts did not need to be reviewed because they are not recognized under County Zoning Code landscaping provisions. Such legalistic analysis does not constitute actual consideration of the impacts of the proposal in this realm. While there may be positive consequences to the road realignment proposal, the negative effects cannot be ignored. The Appellants have sustained their burden of proof to demonstrate that the effects of Norris Estates roadway and utility development on adjacent residential properties will be significant and adverse. Despite the lack of theoretical conflict between the neighboring residential zoning designations, unusual circumstances apply to these impacts because the adjacent proposed roadway and utility development is large-scale and essentially nonresidential in character.

15. The determination by the King County SEPA official that construction of the Norris Estates proposal would not result in significant adverse impacts to the water quality of Beaver Lake and to historic residential properties adjacent to the southeast corner of the property was clearly erroneous based on the record as a whole.

DECISION:

The threshold determination appeal of the Beaver Lake Protection Association is GRANTED with respect to the significant adverse environmental impacts of the Norris Estates proposal on the water quality of Beaver Lake and is DENIED in all other respects. The appeal of Shawn and Jane Tillman is GRANTED with respect to the significant adverse environmental impacts of the Norris Estates proposal in the areas of aesthetics, light, glare, and historic and cultural preservation as they affect residential properties located adjacent to the southeast corner of the Norris property. An environmental impact statement shall be performed consistent with the findings and conclusions stated above.

ORDERED this 11th day of January, 1999.

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Stafford L. Smith, Deputy
King County Hearing Examiner

TRANSMITTED this 11th day of January, 1999, to the parties and interested persons named on the attached list. .

MINUTES OF THE JULY 22, 24, 29, 31, AUGUST 4, 5, 7, 12, 13, AND SEPTEMBER 4 and 21, 1998, PUBLIC HEARING ON DDES FILE NOS. L96P0022 and L97SG007 - PROPOSED PLAT OF NORRIS ESTATES, ASSOCIATES SHORELINE SUBSTANTIAL DEVELOPMENT PERMIT, AND APPEAL OF SEPA THRESHOLD DETERMINATION.

Stafford L. Smith was the Hearing Examiner in this proceeding. Participating at the hearing were Lanny Henoch, Rich Hudson, Dick Etherington, Bruce Whittaker, Sharon Walton, Bob Johns, Tom Harman, Dave Shank, Shawn Tillman, Acar Bill, Brad Kleinfelder, Cliff Brooks, John Kimberly Jeanne Detlor, Ron Lindblad, Sharon Steinbis, Donna Carlson, Shirley Jokisch, Andrea Martin, Liese Rajesh, Scott Hamilton, Janis Seil, Dale Gearing, Charlene Plympton, Scott Krahling, Eileen Stahl, Alfred Sauerbrey, Gail Twelves, Ed McCarthy, Greg Allan, Joanna Buehler, Sharon Freechtle, Tom Smayda, Richard Klein, Curtis Koger, Andy Kindig,

The following exhibits were offered and entered into the hearing record **July 22, 1998**:

Exhibit No. 1 LUSD File No. L95P0022 (3 expandable file folders)
Exhibit No. 2 LUSD SEPA file
Exhibit No. 3 LUSD File No. L97SH007
Exhibit No. 4 LUSD staff report
Exhibit No. 5 Pages 43 and 44 of the LUSD staff report containing additional parties of record

Exhibit No. 6 Subdivision Application for L95P0022, received December 5, 1995 (2 pages)
Exhibit No. 7 SEPA Environmental Checklist, signed and received December 5, 1995
Exhibit No. 8 Revised Environmental Checklist, received July 12, 1996
Exhibit No. 9 Revised Environmental Checklist, signed and received June 6, 1997
Exhibit No. 10 Mitigated Determination of Non-significance, issued April 7, 1998
Exhibit No. 11 Affidavit of Posting, received June 30, 1998, regarding the posting a sign giving notice of the July 22, 1998, public hearing
Exhibit No. 12 Revised preliminary plat map entitled "CONCEPTUAL DRAINAGE PRELI. PLAT," received October 28, 1997
Exhibit No. 13 Land Use Map – Kroll Maps 961E & W,577E, 959E & W, and 958E
Exhibit No. 14 King County Assessor Map for the SW ¼ 2-24-6
Exhibit No. 15 Appeal of SEPA Determination from the Beaver Lake Protection Association et al., received April 28, 1998
Exhibit No. 16 Appeal of SEPA Determination from D. Shawn & Jane V. Tillman, received April 28, 1998
Exhibit No. 17 "Norris Estates Wildlife Habitat Survey," Pentec Environmental, Inc., dated March 13, 1996
Exhibit No. 18 "Subsurface Exploration and Preliminary Geotechnical Engineering Report," Associated Earth Sciences, Inc. (AES), October, 1995, (also dated November 6, 1995, page 1 of the report)
Exhibit No. 19 June 25, 1996, letter from AES re "Infiltration and Potential Ground Water Impacts"
Exhibit No. 20 March 7, 1997, letter from AES re "Summary of Communication with Steve Bottheim"
Exhibit No. 21 October 24, 1997, letter from AES re Ground Water Recharge"
Exhibit No. 22 October 4, 1995, letter from Pacific Forest Resources, Inc., re "Norris Property Tree Survey"
Exhibit No. 23 "Wetland Determination on the Norris Property, "GeoDimensions, Inc., dated April 24, 1995
Exhibit No. 24 "Traffic Impact Analysis…," William Popp Associates (WPA), dated August 29, 1995
Exhibit No. 25 Norris Estates Drainage Analysis-Level 1 and Level 2 Downstream Drainage Analysis…," Shapiro & Associates, Inc., November 1995
Exhibit No. 26 "Norris Estates-Supplemental Drainage Information," Shapiro & Associates, Inc., June, 1996
Exhibit No. 27 "Hydraulic Evaluation for Southeast 24th Street…," Shapiro & Associates, Inc. and Hazardous Engineering, March 1997
Exhibit No. 28 September 8, 1997, letter from Shapiro & Assoc., Inc. re "Hydraulic Evaluation of Southeast 24th Street"
Exhibit No. 29 October 23, 1997, letter from Shapiro & Associates, Inc., re "Effect of the Proposed Norris Estates Development on Levels and Temperature in Beaver Lake"
Exhibit No. 30 A. Road Standards Variance Application L96V0078, received July 12, 1992
B. Amendment to Road Standards Variance Application L96V0078, received October 28, 1997
C. May 11m 1998, letter from Ronald J. Paananen, County Engineer, Containing the decision on Road Standards Variance L96V0078

Exhibit No. 31 A. Surface Water Design Manual Variance Application L96V0079, dated June 18, 1996, with attachment dated June 24, 1996
B. "Update to Variance Request…" for L96V0079, dated October 9, 1997
C. Letter from Joe Miles, Supervising Engineer, DDES, and from Jeff O'Neill, Site Engineering and Planning Supervisor, DDES, dated December 24, 1997, containing the decision on Variance L96V0079
Exhibit No. 32 Letter dated July 14, 1998, from Judy and Larry Petersen to Hearing Examiner
Exhibit No. 33 Three pages of photographs taken June 6, 1998, by Tillman of site as seen from Tillman property
Exhibit No. 34 Policy excerpts from East Sammamish Community Plan
Exhibit No. 35 Photographs taken by Tillman of recently constructed detention ponds
Exhibit No. 36 Letter dated July 23, 1998, from Raymond Petit to Hearing Examiner expressing concerns about project
Exhibit No. 37 Vicinity map submitted by Tom Harman
Exhibit No. 38 Letter dated July 22, 1998, from Cliff Brooks to Rich Hudson – read into hearing record by Mr. Brooks
Exhibit No. 39 Board with photographs of Detlor residence
Exhibit No. 40 Letter dated July 22, 1998, from Jeanne Detlor to Hearing Examiner and read into record by Ms. Detlor
Exhibit No. 41 Letter dated July 21, 1998, from Kazuko Bill to Stafford Smith
Exhibit No. 42 Letter (with enclosed photographs) dated July 21, 1998, from Ron Lindblad to Hearing Examiner and read into record by Mr. Lindblad
Exhibit No. 43 Letter date July 22, 1998, from Sharon Steinbis to Hearing Examiner and read into record by Ms. Steinbis

The following exhibits were offered and entered into the hearing record **July 24, 1998**:

Exhibit No. 44 Video of neighborhood prepared and shown by Tom Harman
Exhibit No. 45 Key map and some photographs to Exhibit 44
Exhibit No. 46 Map of plat from Shorelines file showing existing tree locations
Exhibit No. 47 Materials submitted by Kleinfelder including excerpts from Kadler and Knight, 1996
Exhibit No. 48 Kleinfelder company document entitled "Wastewater Treatment Using Aquatic Plants"
Exhibit No. 49 Marked plat map showing Tillman property

The following exhibits were offered and entered into the hearing record **July 29, 1998**:

Exhibit No. 50 Lake Sammamish Total Phosphorus Model – July 1995
Exhibit No. 51 Shorelines and Pollution Control Hearings Boards Final Findings of Fact, Conclusions of Law re SHB No. 93-40 and PCHB No.93-240
Exhibit No. 52 Statement prepared and read into hearing record by Sharon Freechtle and photographs of

activities taken around Beaver Lake Summer of 1996

Exhibit No. 53 Figure 42 from Management Plan
Exhibit No. 54 Technical Memorandum dated July 1, 1998, from Tom Smayda to Al Sauerbrey
Exhibit No. 55 Beaver Lake Management Plan – November 1993
Exhibit No. 56 Resume of Gregory Allan
Exhibit No. 57 Resume of Tom Smayda

The following exhibits were offered and entered into the hearing record **July 31, 1998**:

Exhibit No. 58 Effects of Norris Estates Upon Phosphorus Loading to Beaver Lake dated July 30, 198, by Richard Klein
Exhibit No. 59 Resume of Richard Klein
Exhibit No. 60 Calculations of Treatment Efficiency Required to Meet 80% Phosphorus Goal at Norris Estates
Exhibit No. 61 Effects of Norris Estates Development in the Beaver Lake Subcatchment Upon Phosphorus Loadings (Table 3 – Klein Report – Exhibit No. 58)
Exhibit No. 62 Excerpt from report entitled "Design of Stormwater Filtering Systems" by Richard A. Clayton and Thomas R. Schueler dated December 1996
Exhibit No. 63 Article entitled "Irreducible Pollutant Concentrations Discharged from Urban BMPs" from Watershed Protection Techniques Vol. 2, No. 2 Spring 1996
Exhibit No. 64 Excerpt from document entitled "National Pollutant Removal Performance Database for Stormwater Best Management Practices dated August 1997, prepared for Chesapeake Research Consortium (Abstract; Table III.3 Water Quality Swale Pollutant Removal Efficiency; and Wet Ponds BMP Pollutant Removal Database Parameter Indices)
Exhibit No. 65 Excerpt from report entitled "Evaluation of Nonpoint Source Controls, an EPA/TNRCC Section 319 Grant Report Volume 1 Final Report by City of Austin Drainage Utility Department, Environmental Resources Management Division
Exhibit No. 66 Letter dated November 25, 1996, from Beaver Lake Management District Citizen's Advisory Committee to LUSD
Exhibit No. 67 Trossachs DEIS Technical Appendices re Storm Water Impacts to Beaver Lake and Wetlands ELS 21
Exhibit No. 68 Excerpt from Beaverdam Property FEIS: page 3-58

The following exhibits were offered and entered into the hearing record **August 4, 1998**:

Exhibit No. 69 Document entitled "Developing Eutrophication Standards for Lake Champlain from User Survey Data dated July 1992 by Eric Smeltzer of Vermont Department of Environmental Conservation
Exhibit No. 70 Record of Memorandums and Correspondence for Norris Estates prepared by Shapiro and Associates, Inc. June 1998
Exhibit No. 71 1997 Annual Report Lakemont Stormwater Treatment Facility Monitoring Program

prepared by Shapiro and Associates, Inc. for City of Bellevue Utilities Department

Exhibit No. 72 Schematic of Facility Showing Monitoring Locations (Lakemont Stormwater Treatment Facility)
Exhibit No. 73 US Army Corps of Engineers topographic map of Issaquah Quadrangle
Exhibit No. 74 Figure 1. Outwash channels entering and exiting the valley of glacial Lake Sammamish
Exhibit No. 75 Beaver Lake Phase II Restoration Project 1997 Annual Report
Exhibit No. 76 Removal Efficiencies of Stormwater Control Structures Final Report May 1990, prepared by Environmental & Conservation Services Department, City of Austin, Texas
Exhibit No. 77 Construction status report
Exhibit No. 78 Chart: Sand Filter R/D Experiment

The following exhibits were offered and entered into the hearing record **August 5, 1998**:

Exhibit No. 79 Resume of Andrew C. Kindig, PhD
Exhibit No. 80 Resume of Curtis J. Koger, CPG
Exhibit No. 81 Resume of Edward J. McCarthy, PhD., PE
Exhibit No. 82 Trossachs Tract R Sand Filter Intermittent Construction Phase Monitoring of wet pond (2/3 2-year Ecology sizing) and sand filter in series second construction winter after being put on line
Exhibit No. 83 Design of Stormwater Filtering Systems – December 1996 (prepared for Chesapeake Research Consortium)
Exhibit No. 84 Excerpts from the following sources:
- The Lake and Reservoir Restoration Guidance Manual (EPA)
- A Citizen's Guide to Understanding and Monitoring Lakes and Streams (Joy P. Michaud)
- Restoration and Management of Lakes and Reservoirs (GD Cooke, EB Welch, SZ Peterson, PR Newroth)
- Ecological Effects of Wastewater (EB Welch)
- Beaver Lake Management Plan November 1993 (King County Surface Water Management, Washington State Department of Ecology and Entranco)
- King County Volunteer Lake Monitoring Report December 1997

Exhibit No. 85 Current Beaver Lake Zoning Plan
Exhibit No. 86 Photocopy of Beaver Lake 1996 Aerial Photo
Exhibit No. 87 Evaluation of Water Quality Ponds and Swales in the Issaquah/East Lake Sammamish Basins – October 1995
Exhibit No. 88 Beaver Lake Management Area Water Features and Monitoring Locations Map

The following exhibits were offered and entered into the hearing record **August 5, 1998**:

Exhibit No. 89 ppt graph Chart 1 – Annual Rainfall Totals at 46U North Fork Issaquah Creek

Exhibit No. 90 Inflow Loading Summary for Beaver Lake

Exhibit No. 91 Revised Estimates of Phosphorus Loading to Beaver Lake from Norris Estimates
Exhibit No. 92 E-mail from Dr. Welch to Tom Smayda
Exhibit No. 93 Letter dated September 8, 1997 from Hugh G. Goldsmith & Associates to King County LUSD
Exhibit No. 94 Letter dated February 25, 1998 (revised April 3, 1998) from Hugh G. Goldsmith & Associates to LUSD
Exhibit No. 95 Photographs taken January 1995 of Beaver Lake Estates Pond overflow into Beaver Lake

The following exhibits were offered and entered into the hearing record **August 12, 1998**:

Exhibit No. 96 Letter dated July 29, 1998, with attached photographs from D. Shawn Tillman to Hearing Examiner
Exhibit No. 97 Drainage Improvement Through Beaver Lake Park dated July 17, 1997
Exhibit No. 98 Recommended Conditions; Shoreline Substantial Development Permit L97SH007
Exhibit No. 99 Resume of Michael G. P. Stringam, P. Eng.
Exhibit No. 100 King County Recommended Link Type Capacity Values
Exhibit No. 101 Photographs of Beaver Lake Drive showing various activities – jogging, biking, horseback riding. Taken by Mr. Pettit August 6 and 8, 1998
Exhibit No. 102 Article entitled "Policy Based Capacity: Setting Capacity Limits to Achieve Community Vision, Could the Highway Capacity Manual be Wrong? From Westernite, July-August, 1998, Vol. 52
Exhibit No. 103 Beaver Lake Study Alternatives – 1995 PM Peak Hour Traffic Volumes
Exhibit No. 104 A Resolution of the Beaver Lake Community Club regarding the King County Beaver Lake Loop Study and letters from Al Sauerbrey and Joe McConnell to King County Executive Ron Sims and Dan Burke, Transportation Planning Division.
Exhibit No. 105 Resume of Gary Norris, PE
Exhibit No. 106 Memorandum dated June 25, 1998, from Gary Norris to Stafford Smith in response to June 5, 1998, Prehearing Order inquiry
Exhibit No. 107 Trip distribution map using King County numbers
Exhibit No. 108 Time path analysis
Exhibit No. 109 Material prepared by King County DOT re" Community workshop to discuss alternative for Beaver Lake roadway
Exhibit No. 110 Letter dated July 20, 1998, from De-En Lang, Subdivision Management, with attached maps showing revised recreation proposal.

The following exhibits were offered and entered into the hearing record **August 14, 1998**:

Exhibit No. 111 Memos dated June 1, 1998, and June 2, 1998, from Victor Bishop and Vince Geglia, respectively, to Mike Miller re additional Level of Service information
Exhibit No. 112 Historical City of Redmond traffic counts for East Lake Sammamish Parkway and SR 202

Exhibit No. 113 Fax transmittal cover sheet dated June 22, 1998, from Milton Lim to Gary Norris re Plateau Levels of Service

Exhibit No. 114 Revised SEPA mitigation – Conditions 28.b and 29
Exhibit No. 115 Final minimum density calculation for plat
Exhibit No. 116 Video of 248th submitted by Sharon Steinbis
Exhibit No. 117 Statement prepared and submitted by Brian and Sharon Steinbis
Exhibit No. 118 King County Department of Transportation Bicycling Guidemap

The following exhibit was offered and entered pursuant to administrative continuance for that purpose:

Exhibit No. 118 Traffic report for Issaquah Retail Center submitted by Applicant

SLS:daz
Attachment \platsl95p\l95p0022 rpt